

Intentional Reimplantation of Left Lower Second Molar as an Alternative to Extraction: A Case Report

Reimplante Intencional del Segundo Molar Inferior como Alternativa a la Extracción: Reporte de Caso

Nilton Alves^{1,2}; Carlos Manuel de Oliveira Nascimento³; Edmar Moya⁴ & Naira Figueiredo Deana⁵

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ABSTRACT: In patients who need endodontic re-treatment, and where the prognosis for surgical or non-surgical re-treatment is poor or treatment may be risky, one alternative is to opt for extraction of the affected tooth and replacement by an implant. However treatment by intentional reimplantation (IR) is also a possibility. The object of the present study was to present a case of a patient aged 71 years who needed endodontic re-treatment, where IR treatment was selected. The patient reported spontaneous pain which disappeared completely with the use of analgesics. This tooth had previously been treated endodontically around 1 year earlier, and no pain was reported in the first two months after treatment. Nonetheless, about 3 months before the present consultation, intensity of the symptoms had increased with a sensation of pressure in the apical-coronal direction. Cone-beam computerised tomography (CBCT) showed a periapical lesion in tooth 3.7. Based on the clinical and imaging examinations, acute apical periodontitis was diagnosed in tooth 3.7. The tooth was treated by IR. It was carefully extracted and inspected for cracks or perforations. It was treated under the microscope with root resection, and then retrograde obturation was carried out with bioceramic material. The tooth was then repositioned in its alveolus. It was immobilised for 15 days, after which the patient could return gradually to normal masticatory function. In the 6 months check-up the patient presented no pain or sensitivity to percussion. No root resorption or periapical radiolucency was observed in the periapical X-ray. We conclude that IR is an alternative to extraction followed or not by prosthetic treatment, for patients who need endodontic re-treatment. The treatment presents good levels of success, and of acceptance by the patient.

KEY WORDS: endodontic re-treatment, intentional reimplantation, root canal.

INTRODUCTION

Root canal treatments may fail in between 16 % and 65 % of cases (Haapasalo *et al.*, 2008), generally related with the presence of intra-radicular or extra-radicular microorganisms (Lopes & Siqueira, 1999). Failure may also occur in cases of well-treated teeth, due to the presence of cholesterol crystals or foreign bodies (Siqueira, 2001). Non-surgical endodontic re-treatment (Friedman, 2002), tooth extraction with or without replacement, orthograde re-treatment or apical microsurgery (Karabucak & Setzer, 2007) can be carried out in patients who need additional treatment. Selecting the best treatment for

the patient will depend on the risks, benefits and costs associated with each option, as well as the preferences expressed by the patient (Friedman). When the prognosis for surgical or non-surgical re-treatment is poor, or treatment may be risky for the patient, one alternative is to opt for extraction of the affected tooth and replacement by an implant; treatment by intentional reimplantation (IR) is also a possibility (Mainkar, 2017). IR involves extracting a tooth in order to carry out a filling repair or root treatment, and then reinserting it in its alveolus (American Association of Endodontics, 2016).

¹ Center of Excellence in Surgical and Morphological Research (CEMyQ), Faculty of Medicine, Universidad de La Frontera, Temuco, Chile.

² Applied Morphology Research Center (CIMA), Faculty of Dentistry, Universidad de La Frontera, Temuco, Chile. ORCID ID: 0000-0001-7878-1810

³ Private Clinic, Chatou, France.

⁴ Endodontic Training Center, Oslo, Norway.

⁵ Center for Research in Epidemiology, Economics and Oral Public Health (CIEESPO), Faculty of Dentistry, Universidad de La Frontera, Temuco, Chile.

The reliability of IR is still questioned, and some authors consider it to be a last resource procedure (Al-Quran *et al.*, 2011). Some complications have been reported after IR treatment, such as root resorption or ankylosis; a higherrate of complications may be associated with extra-oral preparation time exceeding 15 minutes (Cho *et al.*, 2016). However, systematic reviews and metaanalyses have indicated a survival rate of 88 %-89.1 % in teeth treated by IR (Torabinejad *et al.*, 2015; Mainkar). Other authors have indicated that using the patient's own tooth instead of a prosthesis increases the resistance to occlusal load, maintains the periodontal ligament and surrounding bone, and produces a better aesthetic appearance (Andreasen *et al.*, 1990). Moreover, IR is a cheaper treatment than implant insertion (Torabinejad *et al.*; Mainkar) and can be an attractive alternative when the anatomy of the region prevents conventional surgery (Torabinejad *et al.*). The object of the present study is to present a case of a patient aged 71 years who needed endodontic re-treatment, where IR was selected.

CASE REPORT

The patient was a 71-year-old female, with generally good oral health; she had good oral hygiene and was not taking any medication. The patient reported spontaneous pain in tooth 3.7 which disappeared completely with the use of analgesics, and moderate pain during mastication. In clinical examination, tooth 3.7 presented moderate pain under vertical percussion and only slight sensitivity to horizontal percussion. The tooth had already received endodontic treatment approximately one year

previously. According to the patient she had not felt any spontaneous pain for two months after that treatment, however she felt slight sensitivity to vertical percussion, exacerbated when prosthetic rehabilitation was carried out with a crown and metal retainer. She also reported that the intensity of the symptoms had increased during the last 3 months, with the appearance of a sensation of pressure in the apical-coronal direction. She had used antibiotics and analgesics. Cone-beam computerised tomography (CBCT) showed a periapical lesion in tooth 3.7 (Fig. 1). Based on the clinical and imaging examinations, acute apical periodontitis in tooth 3.7 was diagnosed. Occlusal adjustment was carried out as a point of premature contact was found after the patient reported the symptoms described.

In clinical examination prior to surgery, it was found that tooth 3.7 presented slight mobility, pain in vertical and horizontal percussion and slight inflammation of the gum in the vestibular region. Periodontal probing showed a depth of 5 mm in the vestibular region, 4 mm in the mesiovestibular and distovestibular and 3 mm in the mesiolingual and distolingual.

Surgical procedure: First, anaesthesia was carried out by regional block of the inferior alveolar, lingual and buccal nerves with Articaine 1/100,000. The tooth was then carefully extracted to avoid fracture and maintain the periodontal ligament, using Luxator® elevators and an atraumatic forceps (Power dental USA, Inc). Curettage of the lesion was carried out with a LUCAS curette (Hu-Friedy). The extracted tooth was analyzed under the microscope (LEICA M 200, 10x magnification); the root was inspected carefully and no fractures or cracks were found. Then 3 mm of root was resected, perpendicular to the long axis, and the root canals were prepared for obturation with bioceramic material (TotalFill® BC RRM™ Fast-set Putty, FKG) at the end of the root. This procedure was carried out under the microscope (16x magnification), using a conical trunk diamond bur (KOMET), sterile physiological serum and sterile paper cones (40.04) (FKG). Finally, after 8 minutes of extra-oral preparation, the tooth was reimplanted in its own alveolus (Fig. 2).



Fig. 1. CBCT image showing periapical lesion in tooth 3.7. A. coronal view. B. sagittal view.

After reimplantation, a rigid containment was installed using BULKFILL resin (DEXTER) in the lingual region of teeth 3.6 and 3.7. The patient was instructed to use amoxicillin 500 mg (2 g/day) for 7 days, starting 3 days before the intervention; ibuprofen 400 mg (1 tablet 3x/day for 3 days); paracetamol 1000 mg (1 tablet in case of moderate or intense pain between doses of ibuprofen); and application of an ice-pack for the first few hours after surgery.

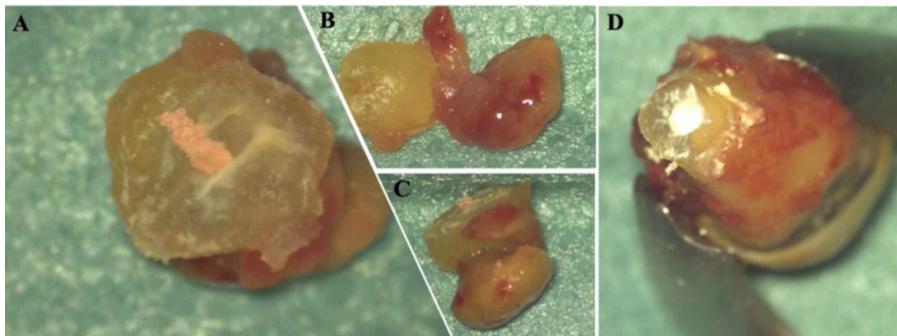


Fig. 2. Extra-oral treatment of tooth 3.7. A. Apical root-end resection. B, C. Apical lesion. D. Root-end filling.

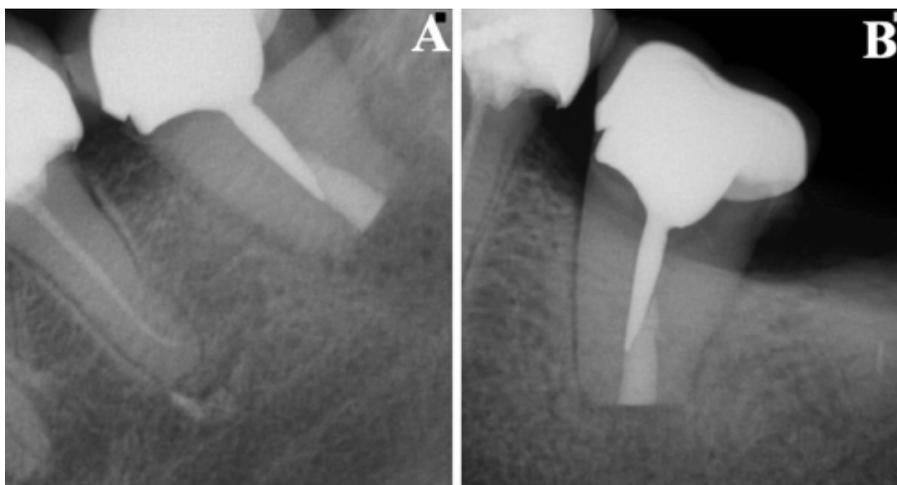


Fig. 3. Periapical X-ray showing absence of root resorption and absence of apical lesion. A. 3 months after IR. B. 6 months after IR.

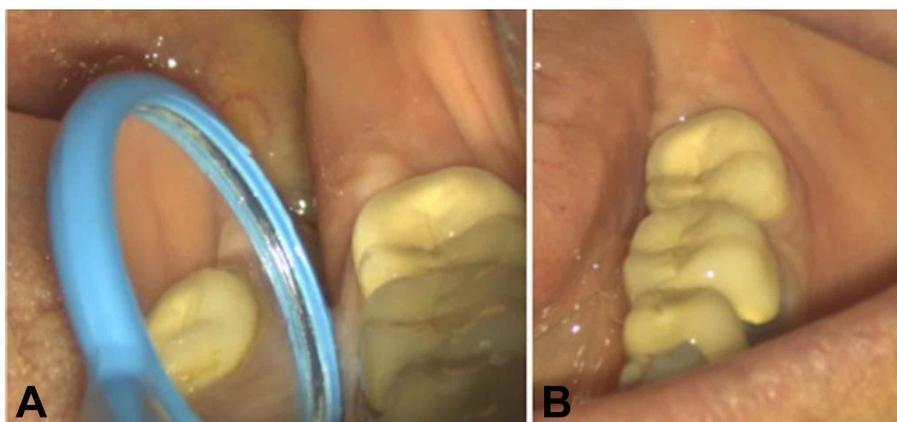


Fig. 4. Intra-oral appearance at the check-up 6 months after IR of tooth 3.7, showing good appearance of the periodontal region.

The containment was removed 15 days after treatment when the patient could start to recover normal mastication, without applying too much force in the region. After the containment had been removed, mobility was found to have diminished significantly; the patient presented no sensitivity to horizontal percussion and only slight sensitivity to vertical percussion. Slight inflammation was found in the free gingival margin of the vestibular region, with slight bleeding under probing. There was no alteration in the probe values before and after the procedure.

At the 3 month check-up the periapical X-ray (Fig. 3A) showed no signs of bone loss or apical radiolucency. The clinical examination found slight sensitivity to horizontal percussion. There was no alteration in the probe depths and the patient reported no pain or sensitivity in mastication. At the 6 month check-up the periapical X-ray (Fig. 3B) showed no bone loss or apical radiolucency. In the clinical examination the periodontal region presented good appearance (Fig. 4), there was no sensitivity to vertical and horizontal percussion and the probe depth in the vestibular region had diminished to 4 mm. The patient reported no pain or sensitivity in mastication. Based on the clinical and imaging examinations, we can state that the IR treatment was successful after 6 months of monitoring, with no complications observed. The patient was asked to return in 6 more months for monitoring (1 year check-up).

DISCUSSION

IR is indicated for patients who need endodontic re-treatment and have a poor prognosis. The execution of the technique must be discussed with the patient as an alternative to extraction and insertion of an implant. If the IR fails, the possibility of prosthetic treatment remains open (Mainkar).

Cho *et al.* (2016) reported that IR presents a retention rate higher than 93 %, and a healing rate between 72 % and 91 %, supporting use of this technique for endodontic treatment. However, some complications can occur after IR treatment. Ankylosis is observed in 6.1 % of men and 8.2 % of women; apical radiolucency in 5.1 % of men and 4.9 % of women; root resorption in 4.1 % of men and 1.6 % of women.

Some factors are related with the success of the treatment, such as lower rate of root resorption in lower teeth than upper (Cho *et al.*, 2016), patient aged less than 40 years, single periodontal bag <6 mm in the pre-operative procedure (Cho *et al.* 2017). In the case reported here the patient was 71 years old, which may increase the risk of failure of the treatment, however the lesion was in a lower tooth and there was no periodontal bag larger than 6 mm, factors which favour a higher success rate in the procedure. We therefore believe that IR was correctly indicated. It may be noted that an important factor for the success of IR treatment, determining greater survival, is extra-oral time. This should be less than 15 minutes to avoid damage to the root surface and improve the prognosis for periapical and periradicular healing (Cho *et al.*, 2016). Cho *et al.* (2016) reported that extending the extra-oral time beyond 15 minutes increased the risk of ankylosis in the patient by 1.7 times. In the present case the extra-oral preparation time was no more than 8 minutes, significantly improving the prognosis for tooth survival.

Teeth which survive the first few years after IR have a high survival rate (Mainkar). Cho *et al.* (2016) state that complications after IR generally occur in the first year after treatment and that the recall rate may be as high as 67.3 % of patients in this period. Complications can also occur 5 years after IR, but on a smaller scale: inflammatory root resorption is diagnosed in 6 % of patients and ankylosis in only 1 % (Andreasen *et al.*, 1995).

In planning the treatment of the case reported here, the first possibility considered was re-treatment with removal of the crown and its retainer, however this possibility was discarded for 5 reasons: 1. The size of the lesions and the involvement of the periodontal region, causing important mobility; 2. The possibility of partial or total fracture of the root during the procedure; 3. The fact that endodontic treatment would have to be carried out correctly, following the recommended protocol, while the X-ray was very satisfactory; 4. It was impossible to guarantee a more hermetic obturation than had been carried out previously; 5. Suspicion of persistent infection due to the presence of a periapical biofilm, with periodontal involvement.

Endodontic micro-surgery was also discarded as this technique is counter-indicated in lower second molars due to difficulties of access and the anatomy of the region. In this region, due to the deviation of the dental arch to lingual and the oblique direction of the mandible, the vestibular bone layer presents thickening due to the vestibular cortical bone (Alves & Cândido, 2009, 2016). Thus the treatment alternatives were, extraction of the affected tooth followed by replacement by an implant, or IR. The patient was asked whether she preferred IR or extraction followed by an implant. The advantages and disadvantages of each technique were explained and both the patient and the dentist agreed on IR. The first 15 days are crucial for evaluating the success of the procedure. The symptoms should diminish or cease when the tooth is returned to its normal function. In the present study, after the immobilisation was removed the patient gradually returned to normal mastication. In the 1 month and 6 month check-ups, the patient did not report any pain or sensitivity to vertical and horizontal percussion, and the CBCT examination showed no apical radiolucency, showing that the treatment was successful.

CONCLUSIONS

We conclude that IR treatment is an alternative to extraction followed or not by prosthetic treatment in patients who need endodontic re-treatment. The treatment presents good levels of success, and of acceptance by the patient.

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RESUMEN: En pacientes que necesitan de retratamiento endodóntico y el retratamiento quirúrgico o no quirúrgico tiene un pronóstico desfavorable o puede ser riesgoso, se puede optar por la extracción del diente afectado y su reemplazo por implante o se puede elegir el tratamiento mediante la técnica de reimplante intencional (RI). El objetivo del presente estudio fue presentar un caso de paciente de 71 años con necesidad de retratamiento endodóntico, donde se optó por la realización del RI. Paciente relatava dolor espontáneo que desaparecía completamente con el uso de analgésicos. Este diente ya había sido tratado endodónticamente hace alrededor de 1 año, y el paciente no reportó dolor en los primeros dos meses después del tratamiento. No obstante, hace aproximadamente 3 meses la intensidad de los síntomas aumentó, junto con la sensación de presión en el sentido ápice-corona. La tomografía computarizada cone-beam (TCCB) mostró lesión periapical en el diente 3.7. Basado en el examen clínico e imagenológico se diagnosticó periodontitis apical aguda en el diente 3.7. Para el tratamiento se realizó la técnica de RI, siendo extraído el diente cuidadosamente, e inspeccionado a fin de localizar fisuras o perforaciones. El diente fue tratado bajo microscopio y se realizó la resección de la raíz. Se realizó la obturación retrógrada con material biocerámico. Enseguida el diente fue reposicionado en su alveolo, la inmovilización fue realizada durante 15 días y la paciente logró retornar gradualmente a su función masticatoria. En el seguimiento de 6 meses la paciente no presentó dolor o sensibilidad a la percusión. En la radiografía periapical no se observó resorción radicular o radiolucencia periapical. Concluimos que el RI en pacientes que necesitan retratamiento endodóntico es una alternativa a la realización de la exodoncia seguida o no, de tratamiento protético, donde existe una buena aceptación por parte del paciente y éxito en el tratamiento.

PALABRAS CLAVE: retratamiento endodóntico, reimplante intencional, conducto radicular.

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Corresponding author:

Naira F. Deana
Universidad de La Frontera
Faculty of Dentistry
Avda. 1145 Francisco Salazar
Casilla54D
Temuco
Postal Code: 4780000
CHILE

Email:n.figueiredo01@ufromail.cl

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